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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/816,691	04/01/2004	Eric R. Blomiley	M122-2510	1647
21567	7590	12/07/2006	EXAMINER	
WELLS ST. JOHN P.S. 601 W. FIRST AVENUE, SUITE 1300 SPOKANE, WA 99201			DHINGRA, RAKESH KUMAR	
			ART UNIT	PAPER NUMBER
			1763	

DATE MAILED: 12/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/816,691	Applicant(s) BLOMILEY ET AL.	
	Examiner Rakesh K. Dhingra	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 October 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6, 8-40, 44 and 154-160 is/are pending in the application.
- 4a) Of the above claim(s) 9, 10, 15-21, 23-29, 32, 33, 35, 36, 38, 39, 44 and 157-160 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8, 11-14, 22, 30, 31, 34, 37, 40 and 154-156 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>10/06</u> | 6) <input type="checkbox"/> Other: _____ |

Election/Restrictions

Claim Objections

Claim identifier for withdrawn claims 38, 39 are not correctly shown in the claim list, since these are withdrawn claims and should therefore be identified as “Withdrawn” instead of “Currently Amended”.

Response to Arguments

Applicant's arguments with respect to claims 1-8, 11-14, 22, 30, 31, 34, 37 and 40-42 have been considered but are moot in view of the new ground(s) of rejection as explained hereunder.

Applicant has amended claim 1, 8, 31, 34 and 37-39 by adding new limitations (for example – “and a recess base, the outer peripheral sidewall connecting with and extending perpendicularly from the recess base” – for claim 1). Applicant has also cancelled claims 7 and 41-43 and added new claims 154-160.

New reference has been found (US Patent No. 5,673,922 – Sherstinsky et al) that when combined with Lei et al reads on amended claim 1 limitations. Further, applicant's argument regarding claim 8 that in Lei reference, the outer peripheral side wall is not perpendicular to recess base is not found persuasive, since as per Figure 7 a portion of the wall is perpendicular (meets the claim limitation). Further, Lei teaches (column 12, lines 44-50) that “inner edge of ----- hoop 282 provides the upright wall”. Dictionary meaning of “upright” includes “perpendicular”. Thus Lei meets claim limitation in this respect. Accordingly claims 1-4, 8, 11-14, 22, 30, 34, 37, 40, 154, 156 have been rejected under 35 USC 103 (a) as explained below. Further, remaining claims 5, 6, 31, 42 and 155 have also been rejected under 35 USC 103 (a) as explained below.

New claims 157-160 (same as earlier withdrawn claims 3, 36, 38, 39) have been withdrawn from consideration since do not pertain to elected species 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-4, 8, 11-14, 22, 30, 34, 37, 40, 154, 156 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sherstinsky et al (US Patent No. 5,673,922) in view of Lei et al (US patent No. 5,556,476).

Regarding Claim 1: Sherstinsky et al teach a substrate support (Figures 5-8) for receiving a substrate to be deposited upon, comprising:

a substrate support member 18 (body) having a substrate receiving side, the substrate receiving side comprising a face having a substrate receiving recess (formed between laminate portion 28 and tapered clearance portion 62) therein, the recess comprising a tapered clearance portion 62 (outer peripheral sidewall) and a recess base (laminate member 28), the outer peripheral sidewall connecting with base of recess (laminate member 28).

Art Unit: 1763

a tapered alignment portion 60 (projection) extending outwardly from a portion of the face, the projection respectively comprising a radially inner sidewall 60 which extends outwardly from the recess outer peripheral sidewall to a projection upper surface 54. Sherstinsky et al also teach (Figures 9, 10) that substrate alignment can also be done by using a plurality of indexing posts 100 (projections) that are disposed at the perimeter of the laminate portion 28 (base of recess). Sherstinsky et al further teach that clearance portion 62 can have other configurations like simple recess or a compound recess with a tapered portion (implying that a portion of the outer peripheral sidewall could be perpendicular to the recess base 28) [column 6, line 12 to column 9, line 47].

Sherstinsky et al teach that tapered clearance portion 62 (outer peripheral sidewall) can have different configurations (including non-taper with respect to recess base 28) but do not explicitly teach that outer peripheral sidewall extends perpendicularly from the recess base.

Lei et al teach an apparatus (Figures 2-7) including a support pedestal (susceptor) 18 for receiving a substrate 24 to be deposited upon, comprising:

a body having a substrate receiving side, the substrate receiving side comprising a face having a pocket (substrate receiving recess) 280 formed therein, the pocket (recess) 280 comprising an outer upright (perpendicular) peripheral sidewall (formed by inner circumferential face of hoop 282); and

at least three guide pins (projections) 224 extending outwardly from a portion of the face (of hoop 282), the projections respectively comprising a radially inner sidewall which extends outwardly from the pocket (recess outer peripheral sidewall) to a projection upper surface (Figure 6 and column 3, lines 20-40 and column 12, lines 25 to column 13, line 35).

Therefore it would have been obvious to use a recess with outer peripheral sidewall disposed perpendicularly to the recess base and also use plurality of projections as taught by Lei et al in the

Art Unit: 1763

apparatus of Sherstinsky et al as per requirement of alignment of substrate (Sherstinsky et al – column 7, lines 40-50).

Regarding Claims 2-4: Lei et al teach that face (upper surface of hoop 282) is annular and is substantially planar [Figure 6].

Regarding Claim 8: Sherstinsky et al in view of Lei et al teach all limitations of the claim (as explained above under claim 1) including that the recess outer peripheral side wall (inner edge of hoop 282) extends perpendicularly relative to recess (pocket) base 280 [Lei et al - Figure 6, 7, 7(a) and column 12, lines 45-55].

Regarding Claim 11: Lei et al teach that guide pins (projections) 224 are received about a circle on the face portion (top face of hoop 282) [Figure 6].

Regarding Claims 12-14: Lei et al teach all limitations of claims including that alignment of substrate (with the help of guide pins 224) is critical in order not to obstruct flow of purge gas to substrate.

Lei et al do not explicitly teach size/proportion of the guide pins (projection) with reference to face portion circle, but teach that design of guide pin is optimized to minimize interference of guide pin (projections) with purge gas flow and required clearance with the substrate during alignment.

It would be obvious to optimize the arcuate size of guide pin (projections) as taught by Lei et al in view of process variables like purge gas flow tolerances and variables like size of wafer and contact area of wafer with guide pins (depending upon material of wafer) to enable passage of purge gas over the entire edge of the substrate [column 4, lines 8-25].

In this connection courts have ruled (Case law):

“It is well settled that determination of optimum values of cause effective variables such as these process parameters is within the skill of one practicing in the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980).”

Art Unit: 1763

“It would have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable through routine experimentation in the absence of a showing of criticality. *In re Woodruff*, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).”

Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. It would have been obvious to one having ordinary skill in the art to have determined the optimum values of the relevant process parameters through routine experimentation in the absence of a showing of criticality. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).”

Regarding Claim 22: Lei et al teach the pedestal (with hoop 282) [susceptor] has an outermost peripheral edge and the guide pins (projections) 224 respectively have an outmost peripheral edge, the guide pins (projections) outermost peripheral edge being received radially inward of the body outermost peripheral edge (Figure 6).

Regarding Claims 30: Lei et al teach all limitations of claims including that height of pocket (recess outer peripheral sidewall) 280 with respect to thickness of substrate is variable depending upon gas flows 286, 288 for purge gas and deposition gas respectively. Thus combined elevation length (sum of recess outer peripheral sidewall and radially inner sidewall) would also be variable and it would be obvious to optimize the height of pocket (recess outer peripheral sidewall) 280 and also the combined elevation length (column 14, lines 15-35) as per process variables like purge and deposition gas flows.

Regarding Claim 34: Sherstinsky et al in view of Lei et al teach all limitations of claim (as explained above under claim 1) and further teach that dimensions of alignment member 50 (that is recess outer peripheral side wall and radial inner side wall) like diameter of alignment ridge 64, its height and height of recessed portion 62 are optimized based upon process variables including substrate dimensions, its expected warpage, flatness tolerance of recess base 28 etc.

Therefore it would have been obvious to optimize the dimensions of alignment member (includes combined elevation length of recess outer peripheral sidewall and radially inner sidewall) as taught by Sherstinsky et al as per process variables including substrate dimensions, its expected warpage, flatness tolerance of recess base 28 etc.

Regarding Claim 37: Lei et al teach the projection upper surface of guide pins (projections) 224 has an uppermost elevation which is received higher than an uppermost surface of a substrate 24 for which the susceptor is designed when said substrate is received by said recess 280 (Figure 6).

Regarding Claim 40: Sherstinsky et al teach that at least a portion of the tapered clearance portion (outer peripheral sidewall) 62 is angled radially downward toward the laminate portion 28 (substrate receiving recess) [Figures 5-8].

Regarding Claim 154: Sherstinsky et al in view of Lei et al teach all limitations of the claim (as explained above under claim 1) including that tapered clearance portion (outer peripheral sidewall) 62 connects with laminate portion 28 (recess base) [Sherstinsky et al - Figure 5].

Regarding Claim 156: Sherstinsky et al in view of Lei et al teach all limitations of the claim (as explained above under claim 1) including that no portion of alignment portion 60 (radially inner sidewall) is received radially inward of the clearance portion 62 (outer peripheral sidewall) [Sherstinsky et al - Figure 5].

Claims 5, 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sherstinsky et al (US patent No. 5,673,922) in view of Lei et al (US Patent No. 5,556,476) as applied to claim 1 and further in view of Mahawili (US Patent No. 6,530, 994).

Regarding Claim 5: Sherstinsky et al in view of Lei et al teach all limitations of the claim except substrate receiving recess is annular.

Mahawili teach an apparatus (Figures 8, 9) that includes a platform (substrate support) 310 that has an annular substrate support surface (recess) 316 having a central opening 320 (column 8, lines 25-60).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use an annular recess for supporting a substrate as taught by Mahawili in the apparatus of

Art Unit: 1763

Sherstinsky et al in view of Lei et al to obtain unimpeded backside heating of substrate and also to permit lifter pins lift the substrate after processing (column 8, line 45 to column 9, line 10).

Regarding Claim 6: Lei et al teach that face portion (upper surface of hoop 282) is annular (Lei et al - Figure 6).

Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sherstinsky et al (US patent No. 5,673,922) in view of Lei et al (US Patent No. 5,556,476), Keeton et al (US Patent No. 7,070,660) and Kashino (US Patent No. 6,890,383).

Regarding Claim 31: Sherstinsky et al in view of Lei et al teach all limitations of claim (as already explained above under claim 1) including that tapered clearance portion 62 (outer peripheral sidewall) can have different configurations as per substrate expected warpage, required clearances between substrate and alignment member etc .

Sherstinsky et al in view of Lei et al do not explicitly teach that recess outer peripheral sidewall has an elevation length which is less than thickness of wafer.

Keeton et al teach a susceptor having a main portion 101 that has a pocket 102 (recess) for receiving a wafer 16. Keeton et al also teach the depth of recess 102 is less than wafer thickness (Figure 5).

Further, Kashino et al teach a susceptor (Figure 2) that has a pocket (recess) for holding a wafer. W. Kashino et al further teach that pocket dimensions (depth and diameter) are designed by considering wafer dimensions and as per process limitations (column 1, lines 30-40).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize depth of pocket (elevation length of recess outer peripheral sidewall) as taught by Kashino in the apparatus of Sherstinsky et al in view of Lei et al and Keeton et al, as per wafer dimensions and relevant process limitations.

Claim 155 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sherstinsky et al (US patent No. 5,673,922) in view of Tsai et al (US Patent No. 6,186,092).

Regarding Claim 155: Sherstinsky et al teach all limitations of the claim including recess, tapered alignment portion 60 (projection), and plurality of indexing posts 100 (projections) [Figures 5, 9, 10].

Sherstinsky et al do not explicitly teach plurality of projections with radial inner sidewall being flat.

Tsai et al teach an apparatus (Figure 2) comprising a support member 30 (substrate support) for holding a substrate 14, and a plurality of guide pins 50 (projections) for alignment of substrate. Tsai et al also teach that guide pins have a flat slanted inner surface 52 (radial inner sidewall) [column 7, lines 10-65].

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use plurality of projections with flat radial inner side wall as taught by Tsai et al in the apparatus of Sherstinsky et al to obtain smooth and sliding receipt of edge of substrate (column 7, lines 30-40).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rakesh K. Dhingra whose telephone number is (571)-272-5959. The examiner can normally be reached on 8:30 -6:00 (Monday - Friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Rakesh Dhingra



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